

CLAIMS

What is claimed is:

- 1 1. An interconnect assembly comprising:
2 a substrate;
3 a resilient contact element having at least a portion thereof which is capable
4 of moving to a first position in which said resilient contact element is
5 in mechanical and electrical contact with another contact element,
6 said resilient contact element being disposed on said substrate;
7 a stop structure disposed on said substrate, said stop structure defining said
8 first position.

- 1 2. An interconnect assembly as in claim 1 wherein said another contact element
2 is disposed on another substrate, and wherein said stop structure defines a separation
3 between said substrate and said another substrate when said resilient contact element
4 is in mechanical and electrical contact with said another contact element.

- 1 3. An interconnect assembly as in claim 2 wherein said stop structure is
2 disposed proximally adjacent to said resilient contact element on said substrate.

- 1 4. An interconnect assembly as in claim 2 wherein said resilient contact
2 element comprises a spring structure.

1 5. An interconnect assembly as in claim 2 wherein said stop structure comprises
2 an adhesive layer.

1 6. An interconnect assembly as in claim 5 wherein said adhesive layer is for
2 bonding to said another substrate.

1 7. An interconnect assembly as in claim 2 wherein said substrate and said
2 another substrate are forced toward each other by a vacuum generated between said
3 substrate and said another substrate.

1 8. An interconnect assembly as in claim 2 wherein said substrate and said
2 another substrate are forced toward each other by one of a pressurized bladder or a
3 bellows and wherein a fluid in said bladder or said bellows is capable of controlling
4 a temperature of at least one of said substrate and said another substrate.

1 9. An interconnect assembly as in claim 2 wherein said interconnect assembly
2 is part of a probe card assembly.

1 10. An interconnect assembly as in claim 2 wherein said interconnect assembly
2 is part of a wafer-level test assembly.

1 11. An interconnect assembly as in claim 2 wherein said stop structure is formed
2 lithographically.

1 12. An interconnect assembly as in claim 2 wherein said stop structure is formed
2 from one of (a) a photoresist material; (b) an epoxy material; (c) a metal coated with
3 an electrophoretic epoxy or (d) a polymeric material.

1 13. An interconnect assembly as in claim 2 wherein said stop structure is formed
2 from a sheet material in which an opening exists and said resilient contact element is
3 disposed in said opening.

1 14. An interconnect assembly as in claim 13 wherein a plurality of resilient
2 contact elements are disposed on said substrate in corresponding openings in said
3 sheet material which is disposed on said substrate.

1 15. An interconnect assembly as in claim 14 wherein said sheet material
2 comprises an adhesive layer.

1 16. An interconnect assembly comprising:
2 a first substrate;
3 a first contact element disposed on said first substrate;
4 a stop structure disposed on said first substrate, said stop structure defining a
5 first position of a resilient contact element in which said resilient
6 contact element is in mechanical and electrical contact with said first
7 contact element.

1 17. An interconnect assembly as in claim 16 wherein said resilient contact
2 element is disposed on a second substrate and wherein said resilient contact element
3 has at least a portion thereof which is capable of moving to said first position when
4 said resilient contact element is compressed.

1 18. An interconnect assembly as in claim 17 wherein said stop structure is
2 disposed proximally adjacent to said first contact element.

1 19. An interconnect assembly as in claim 17 wherein said resilient contact
2 element comprises a spring structure.

1 20. An interconnect assembly as in claim 17 wherein said stop structure
2 comprises an adhesive layer.

1 21. An interconnect assembly as in claim 20 wherein said adhesive layer is for
2 bonding to said another substrate.

1 22. An interconnect assembly as in claim 17 wherein said first substrate and said
2 second substrate are forced toward each other by a vacuum generated between said
3 first substrate and said second substrate.

1 23. An interconnect assembly as in claim 17 wherein said first substrate and said
2 second substrate are forced toward each other by one of a pressurized bladder or a
3 bellows and wherein a fluid in said bladder or said bellows is capable of controlling
4 a temperature of at least one of said first substrate and said second substrate.

1 24. An interconnect assembly as in claim 17 wherein said interconnect assembly
2 is part of a probe card assembly.

1 25. An interconnect assembly as in claim 17 wherein said interconnect assembly
2 is part of a wafer-level test assembly.

1 26. An interconnect assembly as in claim 17 wherein said stop structure is
2 formed lithographically.

1 27. An interconnect assembly as in claim 17 wherein said stop structure is
2 formed from one of (a) a photoresist material; (b) an epoxy material; (c) a metal
3 coated with an electrophoretic epoxy or (d) a polymeric material.

1 28. An interconnect assembly as in claim 17 wherein said stop structure is
2 formed from a sheet material in which an opening exists and said first contact
3 element is disposed in said opening.

1 29. An interconnect assembly as in claim 28 wherein a plurality of first contact
2 elements are disposed on said first substrate in corresponding openings in said sheet
3 material which is disposed on said substrate.

1 30. An interconnect assembly as in claim 29 wherein said sheet material
2 comprises an adhesive layer.

1 31. An interconnect assembly as in claim 2 wherein said substrate is a
2 semiconductor integrated circuit.

1 32. An interconnect assembly as in claim 17 wherein said first substrate is a
2 semiconductor integrated circuit.

1 33. A method for forming a stop structure on a substrate, said method
2 comprising:
3 forming a plurality of openings in a sheet;
4 applying said sheet to a substrate;
5 forming a plurality of contact elements on said substrate in locations
6 corresponding to said plurality of openings, wherein said sheet
7 comprises at least one region disposed around at least one of said
8 openings which is said stop structure.

1 34. A method as in claim 33 wherein said stop structure defines a first position of
2 a resilient contact member on another substrate in which said resilient contact
3 member is in mechanical and electrical contact with one of said contact elements in
4 said at least one of said openings.

1 35. A method as in claim 33 wherein each of said contact elements comprises a
2 resilient contact element disposed on said substrate and which is capable of moving
3 to a first position and wherein said stop structure defines said first position in which
4 said resilient contact element is in mechanical and electrical contact with another
5 contact element on another substrate.

1 36. A method as in claim 33 wherein said substrate is a wafer of semiconductor
2 integrated circuits and said sheet fits on said wafer.

1 37. A method as in claim 33 wherein said sheet comprises a polyimide material.

1 38. A method as in claim 33 further comprising applying an adhesive layer to
2 said sheet.

1 39. A method as in claim 33 wherein said plurality of openings is formed before
2 applying said sheet to said substrate and wherein said plurality of contacts are
3 formed before said sheet is applied to said substrate.

1 40. A method as in claim 33 wherein said plurality of openings is formed after
2 applying said sheet to said substrate.

1 41. A method for forming an interconnect assembly, said method comprising:
2 forming a resilient contact member having at least a portion thereof which is
3 capable of moving to a first position, said resilient contact member
4 being formed on a substrate;
5 forming a stop structure on said substrate, said stop structure defining said
6 first position in which said resilient contact element is in mechanical
7 and electrical contact with another contact element.

1 42. A method as in claim 41 wherein said another contact element is disposed on
2 another substrate.

1 43. A method as in claim 41 wherein said stop structure is formed proximally
2 adjacent to said resilient contact member.

1 44. A method as in claim 41 wherein said resilient contact member comprises a
2 spring structure.

1 45. A method as in claim 42 further comprising forcing together said substrate
2 and said another substrate.

1 46. A method as in claim 41 wherein said stop structure is formed
2 lithographically.

1 47. A method for forming an interconnect assembly, said method comprising:
2 forming a first contact element on a first substrate;
3 forming a stop structure on said first substrate, said stop structure defining a
4 first position of a resilient contact element in which said resilient
5 contact element is in mechanical and electrical contact with said first
6 contact element.

1 48. A method as in claim 47 wherein said resilient contact element is disposed
2 on a second substrate.

1 49. A method as in claim 47 wherein said stop structure is formed proximally
2 adjacent to said first contact element.

1 50. A method as in claim 48 further comprising:
2 forcing together said first substrate and said second substrate, wherein said
3 stop structure defines a minimum separation between said first
4 substrate and said second substrate in which said resilient contact
5 element is in mechanical and electrical contact with said first contact
6 element.

1 51. A method for forming a stop structure on a substrate, said method
2 comprising:
3 applying a sheet to said substrate;
4 forming at least one first contact element on said substrate, said first contact
5 element having a first height relative to said substrate and said sheet
6 having a second height relative to said substrate, said sheet defining a
7 minimum separation which is capable of existing between said
8 substrate and an another substrate having a second contact element
9 which is in mechanical and electrical contact with said first contact
10 element when said minimum separation exists.

1 52. A method as in claim 51 wherein said sheet is a perimeter stop structure.

1 53. A method as in claim 51 wherein said first contact element is a resilient
2 contact element and said first height is greater than said second height.

1 54. A method as in claim 51 wherein said second contact element is a resilient
2 contact element and said first height is less than said second height.

1 55. A method as in claim 51 wherein said sheet comprises an adhesive material
2 which secures said sheet to said substrate.

- 1 56. A method as in claim 51 wherein said sheet covers only a portion of said
- 2 substrate.

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- 1 57. A method as in claim 51 further comprising:
- 2 forcing together said substrate and said another substrate such that they are
- 3 separated by said minimum separation.